

4. Pulsed Electron Beam System to use for the surface modification of the metal and/or partial metal dentures. The system is consisted with an explosive emission cathode, accelerating gap formed by the cathode and plasma anode, and an electron collector where the metal and/or partial metal dentures are fixed, which are placed into guide magnetic field. And in the case, the amplitude of the applied voltage to the accelerating gap is below than 50 kV.

5. Pulsed Electron Beam System to use for the surface modification of the metal and/or partial metal dentures. The accelerating voltage applied to the electron gun is in pulsed mode.

6. Pulsed Electron Beam System to use for the surface modification of the metal and/or partial metal dentures. In the case, pulsed duration is in the range of 0.5 to  $10\mu\text{s}$ . The relation is indicated as  $\tau \approx k \cdot r^2/a$ .

#### ABSTRACT OF THE DISCLOSURE

A Pulsed Electron Beam System is developed and applied for the surface modification of the metal and/or partial metal dentures. The system is consisted with an explosive emission cathode, accelerating gap formed by the cathode and plasma anode, and an electron collector where the metal and/or partial metal dentures are fixed, and placed into a magnetic field. The method can provide a modified metal and/or partial metal denture surface with high reflectance as a mirror polished surface and high corrosion resistance.

In the formula (1), each symbol and the values mean as:

- $r$  : penetration depth of the electrons in material
- $a$  : thermal diffusivity
- $k$  : coefficient which depends on the material properties
- $\lambda$  : thermal conductivity
- $\rho$  : density
- $c$  : heat capacity

Fig 1. :

- 1. Vacuum chamber
- 2. Scroll pump
- 3. Turbo molecular pump
- 4. Flow control valve
- 5. Solenoids
- 6. Anode
- 7. Anode plasma
- 8. Cathode
- 9. Cathode plasma
- 10. Electric double layer
- 11. Electron Beam
- 12. Irradiated denture

Fig. 2. :

- 13. Rotating sample holder
- 14. Solenoid current
- 15. Anode current
- 16. Cathode voltage